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RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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CANNOCK CHASE, AND ITS COAL MINES—No. II.

BY WILLIAM MOLYNEUX.

Before entering upon a description of the minerals of Cannock Chase, and the system of mining in force at the present day, it may not be uninteresting to many to give a brief history of the manner in which these mines were worked in past ages, and the process by which the iron ores were converted into useful metal. It has been stated that, according to an historical document, coal was worked and iron manufactured in the Old Park during the early part of the reign of Edward VI. The site of the "smithy mill" appears to have been in the valley which separates the Castle Hill from that of Brereton Hayes. By the side of a stream which runs through it, and close to a series of oak trees, whose girth is respectively 26 ft. 4 in., 32 ft. 8 in., and 31 ft., are heaps of slag and cinders, the refuse of the smelting and forge works in operation at the period in question. Evidence of the mining of coal, and of the furnace in ages still further removed, is, however, by no means confined to this valley; both in the Old Park and Brereton Hayes there are oak trees growing on heaps of slag, and on the mounds and hollows of old coal workings, which show by their age that the miner and smelter were at work here two or three centuries at least before the Bishop and the Dean and Chapter of Lichfield signed the release (the original of which I had in my hands but three days ago) "of the Manor of Beadesert, with the appurtenances," to Sir William Paget in the year 1549. Curiously enough also, just without the eastern fosse or vallum of a fine old British entrenchment on the Castle Hill, an elevation 900 feet above the sea level, and commanding a view of nine of the surrounding English and Welsh counties, lie scattered mounds of similar cinders, over some of which the plough makes annual furrows, and upon others grow thick and aged thickets of the common hawthorn. The works here would be those of a refinery, the water for which was supplied by a spring, which still fills to a certain extent the fosse of the fortification. In the valleys of Radmore, Hednesford, and other parts of the Chase, always in close proximity to water, are similar mounds, which show the extent of such operations in this district in the past ages of its history.

A short distance from Cannock Chase Colliery, in a north-westerly direction, the ground gathers itself up, as it were, into a broad, gentle hill, on the flank of which, at its termination, are situated the collieries of Mr. Piggott, at Hednesford. Running a little transversely to this hill, in a more northerly line, and cutting through a portion of its range, is a cross fault, joining, probably, up to the main fault, which has but lately been determined by the excavations of the Hednesford and Norton Mineral Railway. The cutting on the west side of the fault exposes the outcrop of seven beds of coal, dipping west at an angle of about one in five. These are, without doubt, the shallow coals of the district, so extensively worked, as is shown by the numerous abandoned pits, in the early times alluded to. I am inclined to the opinion that these are the Brereton beds again brought in, and that below them are to be met the thicker coals both of that place and the Chase.

In the old Park, on the northern flank of Castle Hill, is the outcrop of a seam of coal, 9 feet thick; below it, and separated by a remarkably fine bed of buff-coloured fire-clay, is another bed, 4 feet thick; and lower still other beds, which appear to belong rather to the lower than any of the upper measures of the field. These beds dip south-west, at an angle of 3 ins. in 1 yard; and it is certainly a singular circumstance that in no other instance do I find this 9-feet coal to have been met with or noticed. I can account for it in no other manner than this:—Sections of the old workings do not appear to have been taken with the view of preservation, and the face of this coal is completely hidden by a thick covering of clays and clod. Owing to a tradition that the head of a spring in this hill was that of a mine called Riley's Coal Mine, permission was obtained to examine it, which resulted in the opening of a head, 5 ft. high by 3 ft. wide, driven through the body of the coal, and following its dip for a distance as yet undetermined. This I believe to have been one of the old, and only traditionally-remembered foot-rills, which was originally the only means employed by the miner in obtaining coal; and it would serve at the same time the purpose of a sough to convey the water from the interior of the mine.

In consequence of the mouth being covered, the accumulated water, which now flows brightly enough down its ancient channel, had caused the roof to fall in, about 10 yards from the opening, and till this obstacle is removed no further explorations can be made. To the working of these shallow coals the efforts of the miner have hitherto been confined. Before geology became a science, men interested in the question of mining formed their opinion on the facts placed before their eyes by Nature in its simpler forms, and held to certain rules which experience taught them to be correct and substantial. The outcrops of smut, or coal shales, or, failing these, the impregnation of springs with ochre—coal water, as it was called—were the direct proofs of the existence of the mineral required. Boring was often resorted to, but the more common practice was opening up of the face of the outcrop, or sinking. In the case of the coal being found horizontal, or lying at a slight inclination, the soil or measures by which it was overlaid was removed, and the coal dug out and taken away in barrows. These were called open works. Another plan was that of a foot-rill, or foot-rill, a level driven into the outcrop of the coal, and following its dip. These levels were sometimes 200 yards and upwards in length, but determinable according to the atmospheric condition of the mine, and the means adopted or available for its drainage. For the latter purpose soughs were driven, at an inclination sufficient to ensure a workable floor; they appear to have been very important as well as expensive undertakings, and to have entailed a considerable amount of care in their preservation.

When the dip of the coal was about one in three, or one in five, it was termed a "hanging mine." If it rose with a hill in the form of an anticline, a "cuniculus" was driven into it, and the mineral easily removed down its incline. The other process was by sinking a shaft, and drawing the coal to the surface by means of a gin worked either by a horse or men.

Three sorts of coal appear to have been worked in the Old Park, and these lay at depths varying from 20 to 40 fathoms. The upper and lower coals were mined for general sale, but between them lay a bed of Cannel, one of the best in the kingdom, which was reserved for the owners' special use. This Cannel was of a very hard and compact texture, and capable of receiving a fine polish. Two hundred years ago the pavement of the choir of Lichfield Cathedral consisted of alternate lozenge-shaped blocks of this Cannel and alabaster; and in the gallery of Beadesert was a coat of arms of the Pagets, besides inkstands, candlesticks, and other articles, worked in the same mineral.

A recent examination of the documents connected with the working of the Beadesert Collieries has afforded an insight into some curious customs

which prevailed in this district till, comparatively speaking, a recent period. These collieries were worked by the Earl of Uxbridge, on the charter system. From six to ten pits were in general work, and of the produce of these a weekly account was furnished by each charter-master. That the management was faulty, to say the least, there is no doubt, but one can hardly conceive, according to present facilities, the extent of the obligation under which consumers laid but little more than 70 years ago in obtaining their ordinary fuel. Men are now living who have assisted to demolish the two days' supply of bread, cheese, and ale, which the waggons of the neighbouring gentry made a rule of taking with them when going to these pits for coal. The following is a verbatim copy of a letter addressed to the then agent of the Earl of Uxbridge:—

"Abbots Bromley, Jan. 11, 1788.—DEAR SIR: Having made some enquiry about your collieries, &c., had the following relation:—Wm. Farnie, then a servant to John Sturtin, of Abbots Bromley, went to the pit called Fiddler's pit by four o'clock in the morning, where his cart had been set down 11 days, and as the coals came up out of the pit had loaded it with six or seven horse loads, towards the complement of a full cart load. John Craddock, the bankman or bailiff, was not then attending, but Wm. Craddock was in the pit, and came up; told Farnie he should not be loaded there that day, and immediately took the coals which Farnie had got into his cart out of it, whereupon Farnie went to Hedgford, but meeting with none there returned that day to some of my lord's pits, and saw that two waggons, which had been set down at Fiddler's pit but a few days in comparison to his eleven days, were that day loaded and gone off. I find also that there is a practice among the inferior bankmen or bailiffs, and likewise colliers, to take a naked, that is an ungearied old horse of their own, in the morning when they go to work, and so to possess themselves of the first turn at every pit (notwithstanding set down carriages), which first turn they make a point of selling for a shilling a time, and that these naked old horses earn their owners four or five shillings a day by such nefarious practices of possessing the first turn from pit to pit. Having asked several who know this to be their game, find it to be a truth incontrovertible. Nay, further, it is said that they have permitted some of their poor relations to play this game."

I am, dear Sir, most respectfully, your humble and obedient servant, JNO. BENNETT.

* The horse load was the quantity contained in the basket drawn up the pit by one horse, and I find the coals were sold according to this measure.

THE COAL MINES OF BOHEMIA.

Coal mining in Bohemia has become a subject of considerable interest with a large circle of English capitalists, there having been launched and duly constituted three companies of British investors, and registered under the Limited Liability Act, for the working that very extraordinary coal deposit known as the Karbitz Coal Basin. The names of the companies are respectively known as THE KARBITZ, THE TEPLITZ, THE ELBE. Each of them were ushered into public notice under the auspices of highly respectable London merchants and gentlemen. Each company secured a well filled up list of subscribers to their proposed capital, and have all taken possession of their estates, and set to work in good earnest to win the coal, erect machinery, pumping-engines, and render them productive. We learn from a recent independent visitor to the Karbitz Coal Basin that coal will very soon be regularly brought to bank by the last two mentioned companies in large quantities. The Karbitz Company has won the coal, but is deficient in pumping power to keep the water under, a matter by no means very difficult to accomplish in any of the collieries already at work in the basin. We are informed that the shares in the Teplitz and the Elbe companies are both firmly held by the shareholders, and that they have been nearly absorbed by a few gentlemen, who have made themselves thoroughly acquainted with the value of these undertakings. This state of things has directed the attention of some other enterprising gentlemen to this coal field, and we are informed that it is very probable some new projects will shortly be introduced to the notice of investors. It may, therefore, be interesting to our readers to have a more full account of these Bohemian collieries than has yet appeared in the Journal. The notices which we have before given were rather with a view to point out special merits of particular undertakings, and did not allow of the opportunity for a just appreciation of the great importance of these collieries, as one of the principal resources of Northern and Central Europe for superior descriptions of coal. We propose, therefore, now to give a general account of the great coal formation, known as the Karbitz Coal Basin of Bohemia, and afford the British investor a basis upon which to estimate the value of any new projects which he may be invited to support for the working of coal therein. In the natural order, we proceed to describe its position, and special geological features.

The Karbitz basin is situated to the north-west of Bohemia, and is properly called the Karbitz Brown Coal Basin, which extends over the districts (Kreise) of Ellbogen, Saatz, and Leitmeritz, with a strike from south-west by west to north-east by east along the southern slopes of the "Erzgebirge," or mountain of granite, which latter forms its northern boundary; whilst the south crop rests principally on the chalk and partly on the numerous basalt cones and phonolites of the "Mittelgebirge" of Leitmeritz. The main line of the Vienna, Dresden, and Teplitz Railway passes through the field, and has also branches leading to different parts of it, and thus connects it with the great interior cities and towns of Germany, and also with the principal shipping towns on the Elbe River. It is, indeed, geographically most favourably situated for the transit of its produce, both by land and water. The growing appreciation of the coal by the general population of the district is fully testified by the fact that the present produce of the collieries at work, and in a good position to supply the shipping merchants, have always in hand payments of three months in advance of their deliveries; while the general increasing demand is such that the traffic returns of the railway between Dresden and Prague, show that the consumption during the past two years has increased 50 per cent. Thus, the great cities of Dresden, Meissen, Wittenberg, Magdeburg, and many other places of note, have now placed a higher value upon this coal than upon that obtainable from other collieries more favourably situated to supply them but, whose quality is of a lower order for general purposes.

Geologically speaking, these brown coal measures belong to the tertiary formation, being imbedded between immense deposits of tertiary clay. The peculiar character of the coal, however, may be here more fully particularized. Its general colour is of a dark brown throughout the field, and of a compact structure, exhibiting, however, at intervals distinct layers of a pitch-like coal, possessing a bituminous character, of very close texture, black and shining, destitute of fibrous structure, and resembling in appearance our Cannel coal, and showing a similar fracture. The brown coal is of a distinct fibrous woody structure, and exhibits clearly the vascular and cellular tissue of the original plants. This latter shows upon analysis that it contains 75 per cent. of carbon, and from 4 to 6 per cent. only of ashes, the rest being of a gaseous, volatile, and innocuous nature.

The Karbitz basin contains, in truth, the most remarkable bed of coal yet discovered on the globe, in respect to the extraordinary thickness to which a large portion of it extends over the field, being no less than 90 ft., at other points 80 to 60 ft., while a very large portion of it is not less than 40 ft., and all through of uniform compactness, and also from its freedom from faults and any impurities whatever, being, in fact, a pure lignite, or a pure vegetable bitumen, free from mineral impregnations of any kind. It is, therefore, admirably adapted for being coked for railway and other steam-power uses, as well as for cupola-furnaces, as it has great heating properties. When distilled for oil it is found to be rich in paraffin and photogene. It is thus available for a vast range of manufacturing, domestic, and industrial purposes. There, therefore, can be little question that the recent increase in the demand for the produce of this great coal field will be a continuous one, and thus means of supply will speedily be provided by the enterprising capitalists of Northern Europe, with a very large infusion of the English element. The existence of the coal throughout the entire basin seems to be a matter of entire certainty. There exists no faults or any disadvantageous dips throughout the entire formation, the general character of the dip being such as affords the greatest facilities in the working of the coal. From the reports of the several practical geologists and miners who have visited the Karbitz basin, it appears that the coal is generally won at a depth from the surface of 20 to 60 fathoms, passing through a thin layer of alluvial sand, and then a uniform bed of tertiary clay. For the timbering the shafts there is a superabundant supply of wood, at a cheap rate, from the immediate neighbourhood of the basin.

When this great coal deposit shall be fully appreciated by the scientific English coal mining public, we feel certain that the superior appliances which they will bring into operation, and the better system of working collieries by the English than that which prevails in the Karbitz basin, they will be able to secure large profits in working it. The field is at present largely worked by private native capitalists, and companies of native and foreign composition, and new openings are being continually made. It appears that the coal can be brought to bank at from 1s. to 1s. 6d. per ton, while the royalty ranges from 6d. to 1s. per ton, the prices obtainable being at the rate of 2s. to 3s. per ton profit.

It may be said, with justice, that the coal formation of Karbitz is practically an inexhaustible field of the most valuable description of fuel; indeed it is truly difficult to conceive the enormous quantity of compact coal existing in this large basin, extend-

ing as it does through a large extent of it to a depth of 90 feet, in one uniform compact mass. Its value to Northern Europe, and more particularly to Central Germany, abounding as it does with vast mineral riches which require smelting, and with various manufactures all consuming immense quantities of coal, cannot be too highly appreciated. It will most unquestionably speedily have a very decided effect in the development of the great mineral and other industries of this very peaceful district of Germany, and with which our commercial relations are daily being extended and cemented by our common interests, and making us, as it were, one people.

The following are the names of the principal collieries at work in the Karbitz basin, conducted by native and foreign capitalists:—THE BOHEMIA, the property of the Dessau Credit Mobilier; the ELISABETH PIT; the COUNT NOBILIT; the COUNT WARTHAUS; and the SAKONIA.

FOREIGN MINING AND METALLURGY.

In connection with Belgian metallurgy, we may note that the Minister of Public Works has just reduced to three years the period of the guarantee required for rails manufactured for the State network of lines. The proposed five years' guarantee had been much criticised and objected to by industrialists, who, amongst other reasons, remarked upon the disadvantage which would result to them in connection with deliveries to be made abroad, as a great number of companies adopt as their standard the specifications of the State system. Viewing the matter from this aspect, the step taken by the Minister must be applauded, as tending to facilitate the development of outlets for Belgian products. Much attention is being directed to the creation of forges, blast-furnaces, ironworks, &c., as well as to the opening of new centres for working the minerals of the Luxembourg. The navigations were resumed on the 1st inst., and freights have been maintained at the point at which they stood before the period of enforced idleness. A good season is generally anticipated for the Belgian collieries; the orders on hand are important, and the reduction of 1s. 7d. per ton, proposed to be made in transport charges from Charleroi to Paris, has given a new impulse to that part of the Belgian coal basin. The St. Dizier market does not present any great animation; iron is in demand, purchasers appear in some force, and operations are active and important at sustained prices; but, on the other hand, pig is almost wholly neglected, as is also English pig, which, although offered at very advantageous rates, is the object of only very rare and reduced transactions. The last price named was 4s. 3s. 3d., delivered at St. Dizier. The pig of the Meurthe and the Moselle has made 3s. 9s. 6d. per ton; and some sales of wood-produced pig are noted at 5s. and 5s. 1s. 8d. per ton, the latter price being quoted by sellers. The market for iron, as hinted above, is much stronger. For rolled iron from wood-produced pig, the most general price is 9s. 4s. per ton, with a scale of 8s. between the classes; but some transactions have been concluded at 9s. 8s., and even 9s. 12s. per ton. Sheets have changed hands at 10s. to 10s. 8s. for first-class, and 16s. more per class. Special irons have made 9s. 4s., with an allowance of 8s. per class. Bars have made 10s. 16s. to 11s., and axles, 11s. 12s. to 11s. 16s. per ton. We notice a quotation for Staffordshire iron at Havre, at 10s., and Scotch (Biochran), at 10s. 16s. per ton. The arrival was expected of about 900 tons of Swedish, of which a good portion will be taken off at 14s. 8s. to 14s. 16s. per ton. The works of Hersange and Monnaie, which could not meet with a purchaser at the upset price of 40,000fr., for which they were offered, will, in all probability, be offered for public competition with the Grandville Forge. The conditions of purchase will be much reduced. The discovery of rich bearings of ironstone is reported to have taken place in the department of the Ailier.

The Paris copper market has been quiet, but prices have been sustained with tolerable ease, English in plates making 94s. to 96s.; Lake Superior, 107s. to 108s.; Chilean, 90s. to 91s.; and Corocoro mineral, 96s. Copper has continued in good demand at Havre, especially Lake Superior, which has been dealt in at 105s. to 110s., while Chilean has sustained itself at 88s. The rise which the article has established at Hamburg has exerted a favourable influence on affairs at Havre, and the stock available on the market has found prompt purchasers at preceding rates, while holders now stand out for higher terms. At Cologne there has been a rise of about 2 per cent., and Berlin has firmly maintained previous prices. Tin has undergone considerable variations during the past month on the Dutch market, numerous transactions having been concluded after the public sale. The price of Banca rose rapidly from 76s. to 78s., but purchases having ceased towards the end of the month it has again fallen to 75s. 7s. 7d., 75s. 7s. 7d., and 74s. 7s. 7d.; at this last quotation there still remained sellers at Amsterdam and Rotterdam. The state of the stock was as follows July 31:—

1863. 1862. 1861.

Stock, June 30.....Ingots.....15,250.....20,896

Quantity at public sale.....119,092.....185,103.....149,185

Total.....144,612.....170,443.....170,081

Deliveries in July.....14,759.....31,400.....29,342

Stock, July 31.....129,853.....186,043.....140,739

Arrivals for Society of Commerce, 8,041.....13,301.....14,178

The last quotations from Paris are a little more feeble, Banca standing at 184s., Detroit at 132s., and English at 121s. per ton. Hamburg has also displayed a downward tendency, in consequence of the reductions in price in England and Holland. In lead there has been little change; rough French and Spanish have made 21s. 16s. to 22s. per ton at Paris. At Hamburg the article has been rather pressing offered, and prices have been in consequence the turn in favour of buyers. Cologne has been a little firmer, but at Berlin there has not been much business doing. Some change has taken place in the tone of the zinc market, the demand having slackened, and speculation having abandoned the article. At Paris rough Silesian has fallen from 19s. 14s. to 19s. 12s. per ton. Former rates have been maintained at Breslau, but the Hamburg market has exhibited little animation, and prices are almost nominal. On the whole, it is evident that business on the Continent stands in need of the stimulus which would be afforded by confidence and peace.

We entered at some length last week upon the position of the Marseilles

Gas-Lighting, Blast-Furnaces, and Foundries Company, especially with

reference to the working of the Portes and Sencéas Mines. It is certainly

an unusual state of affairs that the colliery which enters for more than

half the amount of the social capital should play only a negative part in supplying

the profit for the year; but the company will, it is expected, remain in this exceptional

position until 1865, when the working of the mines will have been rendered more easy

and abundant by the operations described last week, and transports will be effected more

economically by the establishment of a line of railway, the execution of which has been

solicited at the hands of the great Paris, Lyons, and Mediterranean Company. This

company has undertaken to construct within a period of eight years a line from Ais to

Brionne, and the part of this line between Ais and Chambord, which interests

the mining undertaking, is expected to be very shortly opened for traffic. Operations

are being actively carried on with the Bégué tunnel, the only work of art which in-

volves doubts as to the probable period when the works will be completed; and it may

be hoped that the line will be opened by the end of 1865 between Ais and Chambor-

naud, a distance of 17½ miles. A branch must be constructed at Chambord in order

to attach the company's colliery to the main line, from which it is distant about 2½ miles;

and the directors are negotiating with the Paris, Lyons, and Mediterranean with a view

to its undertaking as soon as possible the formation of this branch. It is to the in-

terest of the railway company to unite the mines to its system, as their extraction can

then be greatly developed, and larger quantities of coal can be conveyed to Marseilles

than at present find their way there. From the various details which have been afforded,

it will be seen that the industrial company's enterprise is progressing in a favourable

manner. The gas-works and blast-furnaces are rapidly developing an extended produc-

tion, and it is easy to foresee the period when the colliery will associate itself with the

general movement. But an inseparable condition of this progress is the outlay of a cor-

responding capital, not merely in respect of works of first establishment, which have to

be executed in order to bring the production to the level of the demand, but also as re-

gards the expansion which the floating capital must receive under the form of combust-

ible and minerals, in order to keep pace with the productive power of the establishments.

It has become necessary, then, to create new resources, and a loan has accordingly been

determined on to the extent of 120,000fr. The dividend for 1862 is at the rate of 16s.

per share, as compared with 12s. 6d. per share in 1861. Another French coal mining

and metallurgical enterprise—the Société Houillière et Métallurgique des Asturies—has

just held its annual meeting. The report presented by the administration, showed that

the working operations are making progress, but that net profits have not yet been real-

ized. Considerable first establishment expenses have been incurred, but important

ameliorations are hoped for and anticipated during the current year in the position of the

undertaking.

M. Laur, mining engineer, has delivered to the French Minister of Public

Works a report on the production of the precious metals in California.

M. Laur was charged with the subject of making a personal investigation

of the matter on the spot, and he states as the result of his enquiries several

act of interest. Thus it appears that the mean daily returns realized, which stood at 5s. 6d. in 1846 and 1849, 2s. 10d. in 1850, and 2s. 11s. 3d. in 1851, had fallen to 1s. in 1852, 1s. 6d. in 1856, and 10s. 2d. in 1858. Formerly mining labours were individual and in some degree manual. Then came a system of associated miners, and now gold-seeking in California has reached the phase of systematic organized industrial operations. Association and machinery will yet, however, accomplish great things in California, and certain and great results may be anticipated.

Returning to the subject of the mineral wealth of France, we may note with reference to the department of the Ariège that the tertiary formations composed of ancient rocks, sand, and clay, deposited on the northern slope of the crystalline and stratified rocks of the Pyrenees, appear to enclose great quantities of gold, and in offer much analogy to the auriferous formations of Siberia. The part of these formations which borders the shores of the Ariège river, between Crampagnac and Severan, for a distance of 12½ miles, is constantly auriferous. The gold detached from these formations by the waters of the Ariège deposits itself for all this distance in the bed of the river, and 20 little streams which flow into it. The gold thus brought to light presents itself under the form of small nuggets, some of which are worth as much as 2s. each. The tertiary formation situated in the immediate neighbourhood of, and in contact with, the mass of the Pyrenees, appears to be auriferous in the whole extent of the department of the Ariège, and has been worked in former times in the valleys of the Salat and the Garonne. It appears even that auriferous alluvial deposits exist, as in the Goral and the Altal, in the interior of the mass of the Pyrenees. Such in the case with auriferous deposits which have been worked in the valleys of the Neste and the Salat near St. Girons, in the neighbourhood of Bastide-de-Seron, in the rivières of the Beouze, the Tallot, the Petron, the St. Martin, the Arise, &c. These auriferous deposits appear to have been worked from time immemorial. At the time of the discovery of America the extraction of gold in the Pyrenees was still very important, but the fall in the value of the precious metals since that period has involved the decadence of the gold-seeking industry of the locality. The gold had to be delivered to the Mint of Toulouse, at the rate of 72 livres per ounce, while the market price exceeded 80 livres; this obligation led workers to sell clandestinely a part of the metal obtained. Nevertheless, up to the end of the sixteenth century, the Mint of Toulouse still received annually 100 lbs. of gold. From 1750 to 1762, the workings of the valley of the Ariège only delivered to the Pamiers purchase office about 50 lbs. annually. The gold was extracted either from the alluvia deposited in the beds of the rivers, at the expense of the tertiary lands which formed the banks, or from the tertiary lands themselves, which were worked with this object, even on occupations cultivated with vines or as prairies. The gold-seekers working in the beds of the rivers often produced an erosion of the banks, and this led to frequent collisions between the miners and the proprietors of land on the river banks. A great number of edicts, decrees, and regulations were delivered under the ancient monarchy on the subject of the auriferous workings of the department of the Ariège. The Escanardes Mine, situated in the mountain of that name between the rivers Aroze and Garbet, is composed of auriferous copper pyrites. The ingots of copper extracted from this mine, on being tested at the Mint of Paris, yielded, according to Dietrich, 1/16th per cent. of gold. The Carbolze Zinc Mine, situated in the Carbolze Mountain, in the valley of Ustou, at a distance of 11½ miles above the village of St. Litzier d'Ustou, comprises two parallel veins, each of the thickness of 6 feet 8 in., directed from east to west, having a slope to the north, and encased in a schistose rock mixed with quartz. The mass of the vein is composed principally of red and black blende, associated with a less proportion of galena. The veins could be easily attacked by galleries over their whole extent, and might, according to the *Journal des Mines*, become the centre of a considerable working.

Meetings of Public Companies.

BANTRY BAY SLATE AND SLAB COMPANY.

The first annual meeting of proprietors was held at the offices of the company, Lothbury, on Thursday.—COLONEL GUMM in the chair.

The SECRETARY read the notice convening the meeting.

The report of the directors was submitted, which congratulated the shareholders upon the very favourable prospects of the quarry. From the report of the engineer, it will be observed that by a further small outlay a regular supply of slates and excellent slabs may now be secured, and but little doubt is entertained that dividends may be anticipated at an early date. The directors have to discharge a painful duty in apprising you that the late secretary misappropriated calls amounting to 1611, moneys of the company; efforts have been made to bring him to justice, but as yet without success. On the other hand, they have been fortunate in securing a profit of 1851, upon debentures surrendered with interest, thus reducing the debt to 267, which deficiency has since the closing of the books been made up. After some delay, the directors have succeeded in obtaining a reduction in the purchase-money of the estate to the extent of 5000, upon the payment of the small royalty of 1-18th; which arrangement your board, after mature consideration and practical advice, deemed highly beneficial to your interests. A house (which is an item of value in the assets) has been erected on the grant from the materials to hand, and a pier, or sea wall, as proposed in the prospectus, has been completed since the closing of the company's books. On reference to the engineer's report, it will be found that the quarry is now in a position to turn out 40,000 slates per week, and that the slabs may be made here to keep the water out at high tide, so as to enable the lower beds of the quarry to be worked at once, whilst the quarry is being fully worked from the western side, to prevent the breakage of the slate from the top. The quarry has been cleared at the bottom of the old opening ready for working. As regards the western workings, it is stated that the cross-cut No. 1 has been sunk 2 yards below the bottom of the drain, and yields good slate from this sink, which now requires a small hand-pump to keep it dry. About 5800 large and 4000 common slates have been made, of which 2000 have been used in roofing the manager's house, which has been completed in a substantial and workman-like manner, and is now ready for occupation. A drain, 160 feet in length, has been made to the south of the slates, and is now in use to drain to the lower level, and the surface all cleared, thus leaving this block of slate ready for immediate work. Cross-cuts Nos. 3 and 4 have also been completed, and surface cleared to slate; the vein is over 30 ft. wide, so far as yet proved. There was now, therefore, plenty of room for work, and it is necessary to secure the services of a competent superintendent, to reside at the quarry and take charge of the making of the slates. There was room now to employ 10 dressers and 10 splitters, with quartermen, &c., so as to turn out a large quantity of slates, (say) 40,000 per week, which the quarry is now able to do, as specified in the original report written by him. Some good flags have been made from the top rock, in working the cross-cut, which were sold in Cork at 1s. per yard, leaving 6s. per yard net to the company. A firm in Cork is prepared to take all the slate the company can make, and it, therefore, only requires the necessary arrangements to be made to render the quarry at once remunerative to the shareholders. He estimates that 5000, will be ample now to secure a good stock of slate on hand, and to place the quarry in an independent position. The stores at Bantry have been secured, and a boat purchased; he had, therefore, directed the agent to ship the slates now made to Cork by the next vessel. The whole of the works are properly executed, so as to place the quarry in good working order, so that the slates can be immediately made and sold. The prospects of the company, he was glad to say, were most satisfactory.

The balance-sheet, made up to June 30, showed—Arrears of call and balance of capital not called up, 3623d.

The CHAIRMAN having moved the adoption of the report and accounts, congratulated the shareholders, not only upon the favourable position, but also upon the encouraging prospects of the company's property. It was true that a portion of the preparatory works had been somewhat retarded during the past winter; but, at the same time, considering the short period the company had been established, he thought the meeting would agree with him in thinking that considerable and satisfactory progress had been made. Those in any way acquainted with slate quarries were fully aware of the time occupied, and the great outlay required, not only in the opening of a slate property, but in merely proving whether or not it was worthy of development, and to those it would be the more satisfactory to learn that it was the opinion of the engineer, Mr. E. H. Blake, that within the short space of less than eighteen months the property had been brought into a position to be capable of producing 40,000 slates per week; but as Mr. Blake was present, he (the Chairman) could not do better than refer the shareholders to that gentleman for an opinion as to the productive capabilities of the property, he (the Chairman) contenting himself by stating that the board would be glad to afford any additional information that might be desired.

Mr. ETHELSTAN H. BLAKE explained, by means of a section, the various works in course of prosecution. He stated that, in consequence of the bad weather during the past winter, they had been unable to entirely complete the quarry, but that, in the meantime, some works to the west had been opened, so as to be in a position to develop a large quantity of slate, and render it ready for immediate use. The services of an assistant quartermaster had been engaged as foreman, and the property was now in a position to turn out 40,000 slates per week, for which there was a ready sale. A sea-wall had been made at the eastern quarry, for the purpose of laying out a dressing-floors, and which, he was glad to say, had been completed. Indeed, some slates had already been prepared for market of a greater width and superior quality than had been anticipated. He also mentioned that a drain had been made from the sea level, so as to drain the works under the rise of the hill—that had developed two large blocks of good workable slate to a depth of about 30 feet. As to the general prospects of the property, nothing more favourable could be desired.

Mr. HAMILTON drew attention to the amount charged for preliminary expenses. The CHAIRMAN explained that the amount, which favourably contrasted with many companies that he could mention, included several items which some might consider ought not to come under that head; and, moreover, the amount was agreed upon between the promoters and directors; or, in other words, the promoters undertook the whole of the responsibility and liability for a certain sum.

The SECRETARY said he would be glad to afford any shareholder that required it further information as to the several items.

The motion for the adoption of the report was put and carried unanimously.

Mr. BLAKE, in answer to a question, stated that the whole of the works would be done by contract, so that nothing would be paid for except work actually performed. It would be as well, perhaps, to mention that a number of cross-cuts had been commenced in the western portion of the quarry, so as to enable them to open the blocks of slates in that part of the property. In general terms, he could only reiterate the opinion he had before expressed—that there was a very large quantity of slate, which could be produced at a handsome profit to the shareholders; the property only required opening to place it in a remunerative position.

Mr. ROBINSON enquired the depth to which the quarry had been opened?

Mr. BLAKE replied, to within about 70 ft. above high water-mark.

The CHAIRMAN said that the fact of their slate splitting remarkably well for roofing purposes went well for its quality.

Capt. O'FLAHERTY enquired when it was likely they would commence selling slates?

Mr. BLAKE replied in about two months he hoped to have a good stock on hand.

The CHAIRMAN said he had had some experience of slate quarries, but he had never known an instance of any quarry having been brought within the short period of about a year into such a satisfactory position as had the Bantry Bay property.

A PROPRIETOR said that the amount of capital to be called up would appear to be

some what limited; but as the works are so advanced, he supposed it would be sufficient to put the quarry into a full working condition.

Mr. BLAKE said that he estimated the further expenditure of about 5000, would place the quarry in an efficient and profitable state of working.

Capt. O'FLAHERTY, who knew the property well, considered there was not a finer speculation in England or Ireland.

Mr. BLAKE, in reply to a question, stated that it was somewhat difficult to estimate the actual amount of profit that the slates would realise, but they ought to leave a profit of something like 1s. per 1000, and the property was capable of producing 40,000 weekly. Mr. HAMILTON, referring to a statement in the directors' report, to the effect that "a firm in Cork is prepared to take all the slate the company can make," hoped the board would not enter into any contract for a lengthened period.

The CHAIRMAN said the question of contract had been mentioned to the board, but whether or not the contract would be completed would, of course, depend upon the price offered. The board, however, would not enter into any contract for a lengthened period.

Mr. ROSS said his experience induced him to believe that it was always the best plan to sell slates in the open market.

Mr. HAMILTON said all he desired was that the board should not enter into a contract for a fixed term of years.

The CHAIRMAN assured the hon. proprietor that his wishes would be accorded to, the statement referred to having been mentioned merely with the view of apprising the shareholders of the marketable value of the slates. There was no fear about disposing of the slates, for the demand far exceeded the supply.

Mr. BLAKE said that all along the west coast of Ireland there was a very great demand for slate.

Messrs. F. O'Robertson and W. J. Lindsay were appointed auditors, and their remuneration it was agreed should be 1s. to the board.

The retiring directors were re-elected, and Capt. O'Flaherty was appointed director.

A resolution was passed to the effect that periodical reports from the quarry should be forwarded to the *Mining Journal*.

The meeting was then made special, when resolutions were passed indemnifying the directors from expenses incurred by them, except those occasioned by their own wilful neglect or default; empowering them to execute or abandon any contract that may be entered into by them on behalf of the company; and altering the number of shareholders necessary to form a quorum for the holding of a general meeting from 14 to 11.

A vote of thanks to the Chairman and directors was passed, when the proceedings terminated.

ST. IVES WHEAL ALLEN MINING COMPANY.

At an adjourned meeting of shareholders held at the mine, on Wednesday, Captain Thomas Richards having resigned the office of manager and purser, Mr. T. W. Robinson, of Hayle, was appointed purser, at 5s. 5s. per month; and the leases, books, vouchers, and all other papers belonging to the adventurers, were directed to be handed over to Mr. Robinson, and Capt. T. Richards to have an indemnity and release given to him on doing so, such release to be executed by Mr. J. B. Palmer, the purser, and any other responsible adventurer on the part of the shareholders, the necessary document to be prepared by Mr. E. S. Boyne, of Penzance, solicitor, on behalf of all parties. It was also resolved that the second and third resolutions alleged to have been passed at a meeting of adventurers held on April 4 last, to the effect that for the future the account meetings be held on the mine, and abolishing the office of reference in London, be rescinded, and the alternate account meetings be held in London, at Mr. Murchison's office, Austinfrs, and that the next meeting be held there in October next. Capt. Nancarrow, of St. Ives Consols, was appointed managing and superintending agent, in place of Capt. Richards, at a salary of 3s. 3s. per month, and Messrs. J. B. Palmer, J. H. Marchionni, and H. C. Salmon, were authorized to make such changes in the other agents as they may deem desirable, and on such terms as they deem expedient. A report is to be sent to the London office weekly, and also whenever any important change takes place in the mine, and that the managing agent inspect the mine at least once a fortnight, and make a report.

The accounts, ending with May last, showing a balance against the mine of 5600, 4s. 2d., were allowed, and a call of 10s. 11d. per share was made.

A banking account is to be opened with Messrs. Bolithos and Co., of Hayle, and the purser authorized to overdraft to the extent of 4000. The purser was also instructed to take legal proceedings against the shareholders in arrears of more than two calls. Several relinquishments were made, and Capt. Charles Thomas, of Dolcoath Mine, appointed to be the value of the materials, &c., on the mine on the part of the shareholders.

WORTHING MINING COMPANY.

The annual general meeting of proprietors was held at the company's offices, St. Helen's-place, on Monday, Mr. RICHARD HALETT in the chair.

Mr. G. LIVINGTON (secretary) read the notice convening the meeting.

The report of the directors stated that, although they are not in a position on this occasion to show any profit on the twelve months' working, they considered the mine to be in a sound and prosperous condition, and that its position is such as to give them cause for congratulating the shareholders on the prospect of an early success. The reserves of ore have considerably increased during the past twelve months, and amount at the present time between 6000 and 7000 tons. Orders having been given for the erection of another furnace, the shareholders may expect from this time a large increase in the returns of the mine. The directors are pleased to be able to state that the improvement which took place some time back at the 53 ft. level still continues to hold good, and, in their estimation, is of great importance, not only from the addition to the stock of ore in the mine, but from the fact that the lode continues to hold good in depth, and that the deepest point attained at the present time is the richest. During the past year the results have been—Sales of ore, 13,755, 1s. 4d.; rent in colony, 2555, 9s. 6d.; fees and stamps, 137, 14s.—14,047, 9s. 10d.—Bremer Mine consols, working, &c., 18,600, 9s. 1d.; interest, 694, 15s. 11d.; office expenses, 164, 10s. 4d.—14,697, 14s. 4d. The freehold property of the company remains the same as at the last report—1608 acres. The amount received for rent has been smaller this year than heretofore, which is explained by the fact that the last two or three seasons have been very unfavourable for the farmers, and some tenants have been unable to pay the rents.

The report of the acting manager (Mr. Alfred Hallett) stated that Capt. Priak calculated that there were from 6000 to 7000 tons of ore in reserve above the 53, thus leaving all below that level to credit for the future. During the twelve months there had been raised 1811 tons of ore, and 1805 had been smelted, producing about 48 tons of regulus, and 149 tons 12 cwt. of rough copper, and leaving over 300 tons of ore on hand. The present financial position is not so satisfactory as it was at the close of the preceding year. This is to be accounted for partly by the greatly reduced price of copper, and partly from the repeated failure of the bottom of the copper-furnaces; but it was calculated there was quite sufficient either in copper or ore to cover all liabilities in the colony, valuing rough copper at about 70s. per ton, which still leaves a small margin for profit in England. The total amount of the cost-sheets for the year (exclusive of the cost of Wheel Maria) had been 16,675, 9s. 7d.; the interest paid to the bank, 140, 17s., added to this makes the total amount 16,815, 6s. 7d. The total receipts from drafts, produce, rent, and sales of stores, amounting to 12,211, 9s. 8d., leaving a balance due to the bank of 4594, 16s. 11d., to which 27, 13s. the amount due to the bank on April 13, 1862, make 4197, 9s. 11d. It is anticipated, from the present appearance of the mine, that much more satisfactory statements would be submitted at the close of the present year, and should copper again rise to its old price, it might be fairly estimated that, if the mine could be made to pay its way with the present reduced rate, all increase upon it would be profit.

The CHAIRMAN said, as a copy of the monthly reports received from the colony was sent to each shareholder, there was nothing for him to add, as the shareholders were fully acquainted with the position and prospects of the company as the board were there; and he should be glad to present any explanation that might be desired, or to take into consideration any recommendation that might be suggested for the better management of the mine. He was glad to see two gentlemen from the colony present, one of whom was well acquainted with the mine and the manager, and the other gentleman had lived for many years in the colony. He (the Chairman) had no doubt shareholders would receive with great satisfaction the information those gentlemen had to impart.

Mr. ANDERTON enquired if those gentlemen were shareholders?—The CHAIRMAN replied in the affirmative, and mentioned that one of those gentlemen (Mr. Board) had been one of the directors of the Barra Barra Mine, and, therefore, was likely to be able to judge of the value of the Barra Barra Mine. He believed that in the Barra Barra Mine Mr. Board became a shareholder in the Worthing Company before he came to England. He then moved the reception and adoption of the report and accounts.

Mr. THOMAS LEGGE (the deputy-chairman) seconded the proposition.

Sir GEORGE HODGKINSON enquired the amount of the debt due to the bankers?—The CHAIRMAN replied that on June 30, as stated in the report, the sum amounted to 4000. Sir GEORGE HODGKINSON reminded his fellow-shareholders that the company had now been established, and suggested whether it was not worth the consideration of the directors to see if the property was being worked in the best manner, and in the most advisable way for the interests of the shareholders. He believed that in the Barra Barra Mine he had a good mine, and that, although the ore was at present poor—(A Director: No no); well, he (Sir George) meant that the ore was poor for the colony—(A Director: No no); 20 per cent.—he (Sir George) was speaking of the quality of the ore. He believed they had got yellow ore worth 22 or 23 per cent.; but the black dust produced only 13 or 14 per cent.

Mr. CYRUS LEGG rose to order. The meeting should hear all that Sir George had to say, and then any gentleman could reply to it.

Sir GEORGE HODGKINSON believed that the mine could be made profitable by working it more extensively; but at present the company appeared to be something like a tradesman who had only sufficient capital to half-stock his warehouse with goods. For the last two or three years their acting manager (Mr. Alfred Hallett) had shown the necessity for an expenditure of capital in the building of furnaces and houses for the labourers, and it was very hard upon Mr. Hallett that nothing particular had been done to meet him in that respect, and it was equally so for the shareholders. At the last meeting it was intended by the principal portion of the board that Mr. Hallett's services should not longer be required as the agent for the sale of the ore; but as the directors did not come forward with any proposition, he (Sir George) did not think it would be right that the credit of the company in the colony should in any way be jeopardized, and accordingly suggested that no alteration should be made. Since then he had seen that the mine really wanted more capital; and in several conversations that he had had with Mr. Hallett, they agreed that an expenditure of 5000, or 6000, more capital would at once put the mine into a dividend-paying state. He (Sir George) thereupon induced one of the first houses in the trade to come forward with 5000, upon the condition that they were appointed agents for the sale of the ore. Mr. Hallett was apprised of the name of the house, and there the matter rested. Mr. Hallett knew his (Sir George's) ideas upon the matter, and he believed the shareholders desired to work the mine vigorously. It would be recalled that some time since, when more capital was required, it was proposed to raise 8000, but upon terms which appeared to him anything but judicious, for the moment the Stock Exchange knew these shares were to be issued they dropped the market price, and shareholders were not likely to come forward and give 17s. 6d. per share, when in the meantime the market price was lower. He could not help thinking at that time there was a great want of judgment, because he had no doubt 8000, worth of shares, at 15s. per share, could have been easily disposed of. On mentioning the fact to Mr. Beck, he said it was not wise, because the mere interest would have made up the difference; and, moreover, if that plan had been adopted the mine would, he believed, now be in a dividend-paying condition. As regards the market value of the shares, although he knew the Chairman bought shares of the market at 10s. per share, and by that means prevented a greater decline in their value, yet he did not think it was a desirable proceeding for the interest of the company. He suggested the appointment of a committee, to confer with the directors to look into the present state of the company, and to determine what steps could be taken to advance the interests of the shareholders.

The CHAIRMAN said there was much that had fallen from Sir George Hodgkinson with which he (the Chairman) agreed, but there was also much that he entirely dissented from. In the first place, as regards the purchase of shares, all he could say was that on January 1, 1861, he held 5536 shares, and now held more than he did then. He had

bought 400 shares off the market, at 10s. per share, and he was ready to buy any more at the same price. As regards the want of capital, if, as suggested, these shares had been taken up by the shareholders three years ago, and thus provided the means at the proper time, there was no doubt long ere this the mine would have been in a dividend-paying state, for there were many things in which a great saving might have been effected. In the article of wood (fuel) alone 30 per cent. might be saved if the acting manager were in a position to purchase at certain seasons of the year. Shareholders would recollect that for a long time past copper had been at a low price in the market, but he thought and hoped a better tone now pervaded it. The late rise in the value of that metal would itself make a considerable difference in their receipts. As regards the agency for the sale of the ore, all he could say was that Sir George Hodgkinson had never referred to the house (Messrs. Robert Brooks and Co.), till a short time since, when he informed him they were prepared to advance 5000, which would be of no use to the company. He (the Chairman) could assure the proprietors that this company never stood still for capital, for he had occasionally advanced 5000, or 6000, against the ore coming forward; but, at the same time, those were not funds that the manager could avail himself of for prosecuting the mines, which, however, were now in a very good position, and would soon right themselves.

Mr. CYRUS LEGG said their friend, Sir George Hodgkinson, had enquired what amount the company owed to the bankers. Now, he (Mr. Legg) was not aware that anything was owing to the bankers for the amount was owing to the directors, who had furnished the means upon their own personal responsibility, in order to assist the company. The fact was the debentures, as offered were not taken up as the directors felt they ought to have been, and they, consequently, were compelled to come to the rescue of the company. There was something like 4000, owing in the colony, but at the date of the last advices there was more ore, regulus, and copper in the colony to pay that amount. If the shareholders would analyse the accounts, it would be seen there were 72,000 shares, for which the company had received 50,000. The expenditure had been 97,000, and, consequently, the difference between these amounts must have come from somewhere; it had come from the 4000, owing in the colony, and the 4000, owing for the sale of ore, over and above what the capital had realised. During the past year they had been in a very much better position than hitherto, for the actual sales of ore had realised 13,778, 1s. 4d.; rent in colony, 2555, 9s. 6d.; fees and stamps, 137, 14s.—14,047, 9s. 10d.—The expenditure had been—Bremer Mine, 13,600, 9s. 1d.; interest, 694, 15s. 11d.; and office expenses, 164, 10s. 4d.—making the total 14,697, 14s. 4d. It was true if there had been more furnaces they might have made more copper, and which would have been done if each shareholder had taken his proportion of the 8000 shares, at 17s. 6d. per share. So far as he was concerned, he had neither bought nor sold a share in the company since he first became connected with it. As regards the depressed price of the shares in the market, that arose from an arrangement made by the formation of the company. It was then the fashion to give free shares for certain matters, and which shares were to rank with the other shares. Whenever the price rose in the market, some portion of those shares passed out of the hands who received them; but in a short time, he thought, that objection would be altogether removed. As regards the agency for the sale of the ore, the directors were told that Messrs. Brooks and Co. were willing to advance 5000, if they were appointed the agents of the company; but he (Mr. Legg) should most certainly object to such an arrangement, and for this reason, that it would in no way assist the company. The directors protected themselves for the advance they had made by the 8000 shares unpaid; but he hoped they would be able to recoup themselves without taking those shares, for the last advices from the colony led them to believe that in three or four months sufficient ore would be raised to get the company entirely out of debt, as it was anticipated the quantity of copper monthly would be something like 20 tons. But he hoped they would never pay a dividend until the company was entirely out of debt. There was certain value in the Bremer of 34,000, and there had been expended upon the Worthing 27,000, and the directors had received from the public only 50,000.

Mr. ANDERTON was sure that the directors would not make these advances from their personal fortunes, and still hold their interests, if they had not the fullest confidence in the central action of the undertaking. So strongly was he convinced of this fact, that he (Mr. Anderton) was willing to increase his interest to, probably, 1000 shares.

Dr. WORTON said he had never sold a share, although he held between 4000 and 5000, for he always had the greatest confidence in the mine, and more now than ever. A ready mine was in such a position that it would take two years to remove the ore, without any tutwork operations being carried on.

Mr. ANDERTON said he should be glad to hear the opinions of the gentlemen referred to as having recently returned from South Australia.

Mr. BOARD said, immediately after the first time he saw the mine (he referred to the Bremer) he purchased a certain number of shares, and as soon as the issue of new shares was made he applied for his proportion. Since then he had bought more, and was still willing to increase his interest. There could be no question that from the very commencement the mine had wanted capital, for the Bremer was so far from being a wedge-like mine, the deposit of ore beginning small at the top, and increasing as the depth was extended. It was his opinion that the returns would be very materially increased when a level some 10 or 20 fms. deeper had been reached. Indeed, he believed, it would be capable of producing ten times the quantity of ore that was at present being raised, but they would want furnaces to smelt it. As regards the Worthing Mine, he should recommend them to dispose of that property as soon as they could, although there was no doubt that in doing so it would itself be a mine. So far as gold was concerned, the gold district was some 30 miles from Worthing, but as soon as the Bremer had been well opened, it might be advisable to develop the gold fields.

A PROPRIETOR enquired if any portion of the gold fields had been tested?

Mr. BOARD said that Mr. Alfred Hallett, some years ago, explored some portion of the gold district, but it was impossible to do anything without having adequate machinery. Upon his first purchasing an interest in this company, he took some specimens of the copper ore from the 10, 20, and 30 ft. levels to an eminent geologist, who said "Whatever you do, buy in that mine, for it must produce immense quantities of rich mineral in depth; it is sure to produce immense riches, if the explorations are only carried deep enough. Although he (Mr. Board) knew it had been done with economic motives, yet he believed if the shaft had been continuously sunk instead of the level having been extended, that quite as much ore would have been raised, and they would have gained the important object of having the shaft down considerably below its present point.

Mr. ANDERTON suggested that each shareholder should pay 2s. 6d. or 3s. 6d. per share, which would at once provide sufficient means to clear the mine from debt, and enable them to erect more furnaces.

The CHAIRMAN said the suggestion could not be adopted, as it was a limited company, and the amount share had been fully paid up; the shareholders consulted their own interests, they would take the unpaid shares in the proportion they at present held, which would be one in nine.

The report and accounts were then unanimously received and adopted.

The retiring directors and auditors were re-appointed.

A vote of thanks was passed to the Chairman and directors for their continued attention to the interests of the company; and, as proposed by Mr. RAY, and seconded by Sir George Hodgkinson, a similar compliment was passed to the colonial committee, and to Mr. Alfred Hallett, the acting manager. Thanks were also voted to Mr. Board for the satisfactory information he had communicated with reference to the company's property, and to the secretary for his assiduous services during the past year.

The proceedings then terminated.

SALES OF BLACK TIN.

BLACK TIN SOLD FOR THE QUARTER ENDING JUNE, 1863.

Mines.	Tons.	Amount.
St. Day United	127	7,516 0 0
Great Wheal Fortunes	94	4,937 0 0
Great Wheal Vor	85	6,170 18 0
Basset and Grylls	72	4,557 2 6
Wheal Grylls	63	4,376 3 6
Drake Wallis	60	4,326 12 9
Pedn-an-drea	61	4,245 4 3
Par Consols	58	4,737 0 0
Great Wheal Bury	58	3,532 11 0
Wheal Kitty (St. Agnes)	51	3,450 18 6
Pobberro	50	3,382 0 0
St. Just United	38	2,800 2 6
Boscawell	39	2,637 10 0
Wendron Consols	37	2,572 10 0
Wheal Kitty (Lelant)	32	2,276 3 9
South Carn Bre	35	2,261 14 11
Boscawen	30	2,188 14 2
West Forey Consols	23	1,969 2 6
Carnarvon	23	1,818 11 6
West Beam	23	1,645 8 3
Stray Park	—	1,406 18 0
Great Work	17	1,301 18 0
Prosper United	16	1,119 18 6
Pobberro	16	1,076 0 0
Cornubia	15	1,063 9 6
Phoenix	16	1,052 10 9
Trevelan and Tremere	14	1,026 19 0
Fennels	12	899 9 6
East Wheal Grenville	12	874 0 0
Gurlyn	13	886 18 0
Wheal Sidney	11	779 4 2
Garlinda United	10	710 8 6
Leeds and St. Aubyn	8	551 1 0
North Basset	7	522 6 7
New Wheal Prospidnick	6	419 0 0
Cudra	6	397 15 10
Wheal Vyvyan	6	342 6 6
Redmoor	5	321 6 0

FILE MAKING BY MACHINERY—BERNOT'S PATENT.

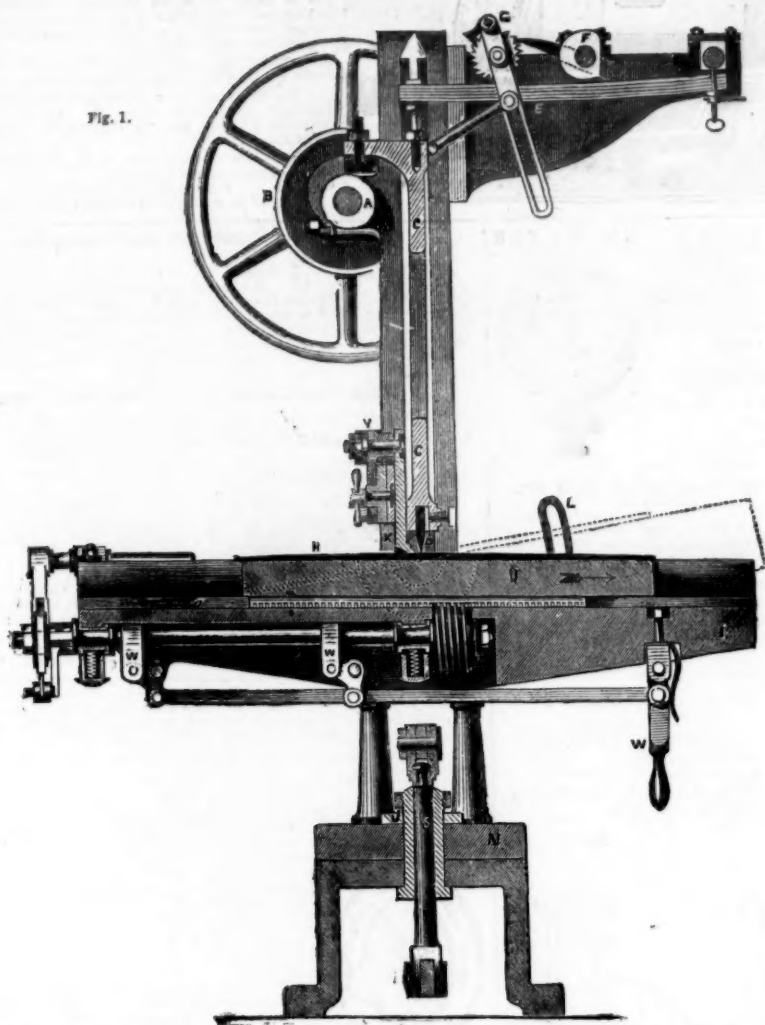


Fig. 1.

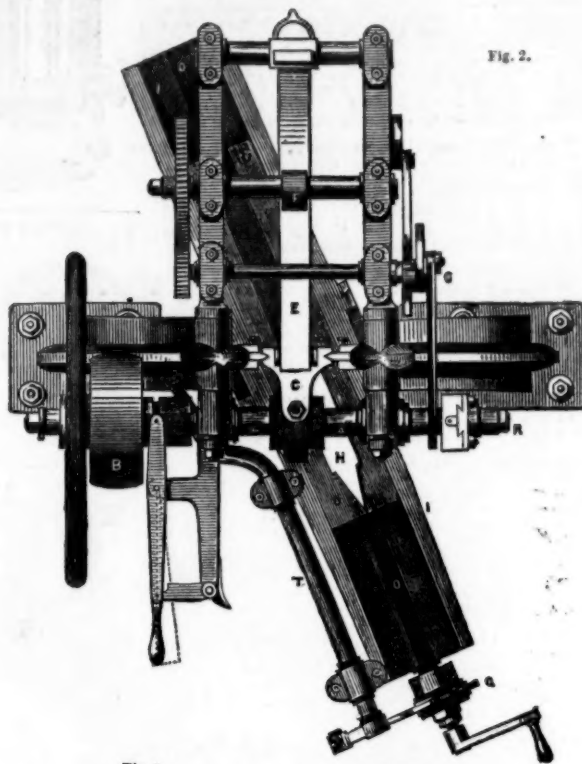


Fig. 2.

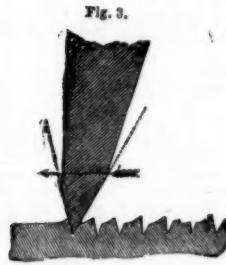


Fig. 3.

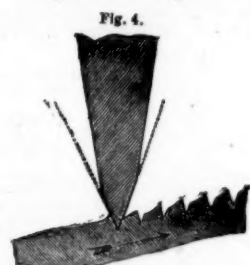


Fig. 4.

The readers of the *Mining Journal* are already aware that an influential company has been formed for the purpose of superseding hand labour in the manufacture of files, and, in fulfilment of our promise, we now propose to make some allusion to the report of Mr. Allison upon the subject. This report is of a very elaborate character, and whilst treating the subject of machine file-making exhaustively, it also gives such ample information with regard to making by hand, that every opportunity is afforded for a thorough comparison of the two systems. The file trade is acknowledged to be one of the most important of our manufactures, and great inducement exists to introduce machinery as a substitute for hand labour; hitherto, however, insurmountable difficulties have prevented the change, and Mr. Allison considers, and his opinion will be very generally concurred with, that their failure is owing to persistent attempts to re-produce in a machine the very actions and motions of the human being; but that Mr. Bernot has succeeded, because his file-cutting machine gives results similar to human labour, with the effective motions best suited to a machine. He continues that "this invention of Mr. Bernot contains the great first principles, without which machines for cutting files will fail. This machine is the product of years of study, and is a marvel of perfection. During the period of four years it has been at work the persons using it have been unable to suggest any improvement; this is the best and strongest testimony that can be given of the soundness of the original conception, and of the manner in which that conception is embodied in the machine." The statement of such facts, and the expression of such opinions, carry their own convictions; we may, therefore, at once proceed to describe the machine.

The above diagrams represent a vertical section and a plan of the machine, as well as the relative position of the blank being cut, and the cutting-tool in hand-cutting, and in Mr. Bernot's machine. The slight difference between keeping the file straight and inclining the cutting-tool, and inclining the file and keeping the cutting-tool straight might, at first sight, appear unimportant, but very little consideration will convince that it is a trifling modification which enables a machine to work under the greatest advantage, and at the same time assimilate hand labour, and upon which the success or failure of a mechanical invention intended to supersede hand labour depends.

The engravings show the various parts of a machine for cutting 16-inch bastards, which is nearly the largest size that would be used. Fig. 1 is a vertical section of the machine, and Fig. 2 a plan. The main shaft, A, is mounted near the top of the framing, and is driven by a clutch that engages with a similar clutch on the boss of the driving pulley and fly-wheel, B, which when the clutch is out of gear runs loose upon the shaft; the clutch is moved by a hand lever with suitable notches to hold it in and out of gear, as shown in the plan. The vertical slide, C, is lifted by a cam on the main shaft, and

slides between adjustable V guides, fixed in the frame of the machine. The cutting chisel, D, shown black, is held in a socket in the bottom of the vertical slide, C, and is secured by a set screw. The blow is given by means of the horizontal flat spring, E, which is fixed at the outer end to a rocking shaft carried in a bracket at the back of the main frame, and forming the fulcrum against which the spring is bent when the slide, C, is lifted by the cam on the shaft, A, the spring being always in contact with the head of the slide, C. The pressure of the spring and consequent depth of cut of the chisel is regulated by an adjusting screw at the outer end of the spring, and in the case of cutting a parallel file this pressure is kept the same throughout. But in cutting a taper file, the pressure is varied in the same proportion as the breadth of the file varies, so as to maintain an equal depth of cut throughout, by means of the pressure cam, F, being made to rotate during the traverse of the file; and the radius of the cam is made to increase and diminish in the proportion of the breadth of the file, thus varying the amount of deflection of the spring at each cut to the required proportion. The rotation of the cam is effected by means of the ratchet-wheel, G, worked by an eccentric upon the main shaft, A, and thrown out of gear when a parallel file is being cut. The file blank, H, to be cut is fixed upon a compound bed, I, which admits of adjustment to any obliquity horizontally, and to any inclination vertically. The file bed is secured in position by means of the circular slot L, which is fixed to one of the pedestals. These two movements of the bed give the required obliquity of the chisel out across the face of the file, and the inclination of the chisel to the plane of the file face, the chisel itself remaining always vertical. The trunnions of the file bed are recessed into the two pedestals, each supported by two pillars, which are connected at the base by a turning plate, turning on the centre pivot. The upper end of this pivot is provided with a nut and washer to hold the turning plate and secure the file bed in the required oblique position. The horizontal movement or traverse of the file between each cut of the chisel is given by means of a rack, which slides in a longitudinal groove, O, in the file bed, I. This rack is advanced the required distance between each stroke of the chisel by the worm, P, the shaft of which has a ratchet-wheel, Q, fixed on the outer end, which is worked through a series of connecting rods and levers from the crank-pin, R, upon the end of the main shaft, A.

In order to provide for the double motion of adjustment of the file bed, I, with an inclination both vertically and horizontally, this feed motion is communicated through a vertical spindle, S, passing up freely through the tubular centre pivot, J, upon which the file bed turns; the head of the spindle, S, is connected by a horizontal lever and connecting rod with a swivel joint to the cranked rocking shaft, T, which terminates at the centre line of the trunnions, K, on which the file bed rocks; the other end of the rocking shaft, T, carries a pawl that works the ratchet-wheel, Q, on the shaft of the worm, P. The whole of this set of levers is worked by the turning plate, N, of the file bed, and turns freely upon the head of the centre spindle, S, without interfering with their action in driving the worm. The upper side of the file bed is cut out in a semi-circle, and a moveable semi-circular slide, U, which is of sufficient length to carry the file, is fitted into this semi-

circle so as to roll freely in the cavity. To the underside of this slide the rack, O, is attached by means of a groove and a cross piece. At each end of the slide, U, suitable fastenings are attached for holding down the file, with levers, rack, and springs. A handle, W, with connecting rods, bell-crank lever, and springs, is mounted underneath the file bed, I, for disengaging the worm from the rack, O, and allowing the slide, U, to be pushed freely in any way, so as to bring it back easily after the file is cut. On the front of the main frame of the machine is mounted a leveller, X, for the purpose of pressing upon the file, H, and keeping it truly even with the edge of the chisel, D. The upper end of this leveller is joined to a horizontal weighted lever, Y, one end of which is centred on the frame of the machine by means of a link joint, and the other end is weighted by a ball; a rest is provided for holding up the lever when required, so as to keep the leveller, X, clear of the file. Another lever is mounted upon the centre of the frame for the purpose of raising the vertical slide, C, which carries the chisel, and is provided with notches to hold it in position.

The manner in which the machine acts will be so readily understood, that it is unnecessary to give the precise details of the mode of action; but it is stated that, in regard to the durability of the cutting chisels in this machine, it is remarkable that they cut five times as many files as can be cut by hand without re-sharpening; and the reason seems to be that the chisel is driven into the blank and withdrawn again in a perfectly straight line, and without any rubbing action; whereas in hand-cutting the fine edge of the chisel is rubbed a short distance along the surface of the blank until it comes in contact with the last-raised tooth, which is the only guide the hand-cutter has to produce regularity of cut. In the files cut by this machine the teeth are raised with perfect regularity, and, consequently, when the file is used each tooth performs its proper share of the work; whereas in hand-cutting, from the varying power of the muscles, especially towards the close of the day, it is impossible to produce such perfectly uniform work. It is upon these, as well as other considerations, that Mr. Allison concludes that no combination of circumstances since the introduction of weaving by the power-loom has arisen in this country that affords equal prospects of success to that of manufacturing files by machinery.

But as sound principles of mechanical construction in a machine, and excellence of workmanship in the articles produced, have but little attraction to the capitalist, unless accompanied by a good percentage of profit upon any outlay made, the Patent File Company would not but little favour with the public, unless satisfactory particulars could be given upon this point. In the case in question this has already been done; for, as we remarked in the *Mining Journal* of July 26, it is stated that files costing 10½ to make by hand labour can, it is confidently believed, be produced under these patents for 42½, and of better quality; and as 95 per cent. of all files made must be the product of hand labour for some time to come, sell prices will be sustained—circumstances highly favourable to this company, and affording a fair guarantee as to profits. Licences will ultimately be granted for the use of the company's patents, and will, it is anticipated, become an important source of income.

CASTING LARGE INGOTS OF STEEL.—At the present moment, when the development of the Bessemer process offers greater facilities than ever before possessed for the production of steel in large masses, the invention recently patented in this country for the well-known ironmasters, Messrs. Pettit, Gaudet, and Co., of Rive de Gier, who are, perhaps, the most extensive manufacturers of iron according to the Bessemer process on the Continent, is not without interest. Their invention relates to a peculiar construction and arrangements of moulds to be employed in the casting of ingots of steel or other metals, and consists in making such moulds syphon-shaped, the metal being first poured into a main compartment, which communicates at its lower end only with one or more other compartments by lateral apertures or apertures, the metal rising in such other compartments slowly and steadily, although poured rapidly into the main or filling compartment. Each of the compartments in connection with the main compartment is closed at the top, with the exception of a small aperture for the escape of the air and gases. Any number of the compartments may be combined, and the several parts are bolted together, so as to admit of bolting to get out the ingots.

BESSEMER STEEL.—According to an invention recently provisionally specified by Mr. E. B. Wilson, of Parliament-street, it is proposed to disengage entirely with the axes, pinions, centres, or trunnions hitherto employed in suspending converting vessels used in the manufacture of malleable iron and steel, according to the Bessemer process, and to cause such vessels to rotate upon hoops or rollers. One mode of carrying out this invention consists in fitting a segment or hoop, of wrought or cast-iron or steel, on each side of the converting vessel, and to support the same in any suitable framing forming a base or stand to the vessel, or the hoops or segments may be made to rest upon anti-friction pulleys or rollers retained in the base or support. The turning or rotation of the vessel for the purpose of pouring out its contents may be accomplished by a lever, or by the aid of gearing, in which latter case one or more toothed rims or segments may be fitted on to the sides of the vessels, and geared into pinions, actuated by an endless screw, or otherwise. In some cases it is proposed to mount the base or stand upon wheels, whereby facility is afforded for readily transporting the vessel to any desired locality.

OIL FROM SHALE.—Mr. J. McLean, of Broxburn, Linlithgow, has provisionally specified an improved apparatus for treating bituminous minerals, whereby considerably more oil can be obtained from a given quantity than hitherto, whilst the various products obtained in practical working are so thoroughly separated and realised as to correspond very nearly with the analyses of the raw material. The improved apparatus comprises a number of retorts, each retort is about 7 ft. 6 in. long and 1 ft. 6 in. deep, all as measured internally of a cast-iron retort, disposed horizontally, and by preference in sets of three to each furnace. Each retort is about 7 ft. 6 in. long and 1 ft. 6 in. deep, all as measured internally of a cast-iron retort, disposed horizontally, and by preference in sets of three to each furnace. The three being arched over. The furnace grates are about 3 ft. 6 in. in length and 2 ft. wide, and 3 in. fire-brick flags are interspersed between them and the retorts support the latter. The retorts are fitted with doors of boiler-plate, which are fixed across bars, screws, and levers, and each retort is provided with two outlet pipes, by which the distilled products pass off. The outlet pipes are passed through condensing tubes provided with feed and overflow pipes, and kept constantly full of cold water, and on leaving the distern the several sets of retorts are conveyed to the lying pipe or main, by which the products of the several sets of retorts are conveyed to the collecting tank. A second condensing apparatus is applied for any overflow of gas or vapour not

condensed in the first distern, and at a part of the main before it reaches the collecting tank an outlet is provided for separating the ammoniacal liquid from the oil.

TREATMENT OF POOR COPPER ORES FOR IRON.

That the extraction of the copper contained in very poor ores can be effected with profit has already been indisputably proved both in Spain and in Germany, but the profitable extraction of the iron, which invariably exists as an impurity in copper pyrites, is, we are bound to admit, a novelty. Mr. William Henderson's name is already well known as a patentee of a process for the treatment of poor copper pyrites for the extraction of copper, and we have now before us the specification of his invention for obtaining iron and steel by a somewhat analogous process. He tells us that in the manufacture of sulphuric acid from iron pyrites the residue, consisting principally of oxides of iron, still contains from 3 to 9 per cent. of sulphur, and cannot, therefore, be used with advantage for the manufacture of iron. When copper pyrites, or iron pyrites containing copper ore, are used for this manufacture the residue contains copper, besides a certain proportion of sulphur, which renders it still more unfit for the manufacture of iron. Mr. Henderson claims that by his poor copper process, with which our readers have long been familiar, practically all the copper and sulphur are extracted, and that a very pure oxide of iron remains in the residue; to utilise this is the object of the present invention.

To produce cast-iron equal to the best hematite pig, he mixes the residual oxides with bituminous coal, a metallic chloride, and quick lime, all finely powdered, and intimately mixed. These are moistened with water, formed into balls, dried, and fused in a reverberatory furnace. To produce steel direct from these residual oxides of iron he uses the same mixtures as above described, preferring to use charcoal reduced to a coarse powder, but only to the extent of from 10 to 22 per cent. by weight of the dry residues, and with the addition of 2 to 5 per cent. of pure peroxide of manganese. When intimately mixed the whole is charged into a reverberatory furnace, and melted as rapidly as possible in a reducing flame. To produce wrought or malleable iron direct from these residues he mixes them with from 16 to 25 per cent. of bituminous coal, with or without the fluxes mentioned above, and charges them into a reverberatory furnace, consisting of a baling or puddling hearth and a long sloping bed or table, having a hopper fixed at the top or colder end. The mixture is charged into this hopper, and is gradually moved towards the flame bed of the baling hearth, the hopper is kept constantly filled, and so is the back part of the furnace. The table or floor of this extended furnace should be placed on such a slope as will ensure the mixture descending to the furnace bed of its own accord, and be sufficiently capacious to contain as much ore as will supply the furnace bed with a constant supply of reduced ore, and as fast as it can be worked up. The ore, as it descends against the flame, is steadily reduced to a spongy mass, and is withdrawn from the furnace and rolled or hammered in the usual manner. Other compounds of iron can easily be produced by mixing oxides or salts of manganese with the ore and reducing agent, or other oxides or salts of other metals may be reduced and combined with the iron or steel, if desired. In localities where blackband or other carbonaceous ore can be obtained, and if sufficiently free from earthy impurities, they may be employed either wholly or in part as a substitute for the coal, coke, or charcoal, due regard being paid to the proper proportions. He takes, for example, a blackband ore containing 25 per cent. of carbonaceous matter and 40 per cent. of iron. To reduce the iron in this ore from the state of protoxide to a metallic state only 10 to 12 per cent. of the carbonaceous matter will be consumed, leaving 18 to 15 per cent. free. A mixture, therefore, of ore of the above composition reduced to fine powder in the proportion of two of blackband to one of the residues will produce cast-iron.

Now that iron or steel, as the case may be, would be produced by the processes described will not be disputed, and the process has, moreover, the recommendation of claiming to effect that which has not been previously effected with profit—the separation of iron from sulphur residues, it would be interesting to know the cost per ton at which

the iron could be produced, and the price at which it would be saleable, as well as the purposes to which it would be applicable; and, we believe, that inasmuch as there are enormous quantities of the ores which Mr. Henderson proposes to treat obtainable at a merely nominal rate, he has only to show, by a detailed statement of every item of expense, that the value of the iron will exceed the cost of extracting it, to secure the immediate development of his invention.

OBTAINING AND APPLYING MOTIVE-POWER.—According to the invention recently provisionally specified by Mr. D. G. Hope, of Grays, Essex, he proposes to mount upon the face of a vertical fly-wheel three or more cylinders, in such a manner that they will balance each other. These cylinders he fits with loose plungers, and brings the cylinders into communication (by means of the hollow shaft of the fly-wheel and a pipe) with the working cylinder of the engine. This cylinder he fits with a piston, connecting-rod, and crank shaft in the same manner as an ordinary direct-acting steam-engine, with the exception that the front end of the cylinder is left open. The plunger cylinders on the fly-wheel are so arranged that one or other shall be horizontal at the moment that the piston of the working cylinder arrives at the end of the stroke. The action of the machine is as follows:—The plunger cylinders, pipes, and working cylinder are filled to a certain extent with oil or other fluid, and the fly-wheel is connected to suitable driving mechanism by a water-wheel or turbine. Let it be now supposed that the engine is at the end of the stroke, the fly-wheel (carrying the plunger cylinders) must be turned, so that the plunger cylinders shall pass in succession from a horizontal position to a vertical one. As the plungers attain their raised vertical position it will be evident that the weight of the plungers acting on the fluid will compress it to any desired extent. This pressure will be communicated to the working cylinder through the fly-wheel shaft and pipe above mentioned to the engine, and the engine will thereby be caused to make a stroke. As the piston takes the fluid out of the plunger cylinder, the plunger will descend and maintain the pressure until the piston arrives at the end of its stroke; the plunger case will by this time become more horizontal, having made with its fly-wheel one half revolution. The exact converse of this takes place in the succeeding half revolution, with this difference, that the position of the plunger cylinder upon the wheel being reversed, the weight of the plunger creates a vacuum in the cylinder, and the pressure of the air on the working piston causes the completion of the revolution. The fly-wheel carrying the plunger cylinders must, in all cases, be so coupled to the working crank shaft as to retain their relative position to the working piston at all portions of the stroke.

SIBERIAN GRAPHITE.—Mr. Alibert has just presented to the Museum of Natural History, at Paris, some valuable specimens of graphite from the rich deposits in the government of Irkoutsk. The specimens are of great size and purity, and some of them are very artistically wrought, amongst them being a turning of the contour of Siberia. The whole collection is mounted as a trophy upon a magnificent block of nephrite, weighing some 2 cwt.; this the donor has also obtained from the same district.

WROUGHT-IRON CANNON.—A firm in Bridgewater, Massachusetts, are making a gun from wrought-iron, which will weigh, when completed, about 17 tons. It is forged solid, in an octagonal form, with the cavity bored out 13 in. in diameter, and will be hooped with strong bands of iron put on by hydraulic pressure. The lathe on which the metal is being turned is one of the largest in the world.

NEW MODE OF LIGHTING.—A novel mode of lighting has been introduced at a Baptist Church, just built at Philadelphia. There is not a gas-burner in the audience room. In the panels of the ceiling are circles of ground glass, 2 ft. in diameter. Above each of these, in the loft, is an argand burner, and over the burner a powerful reflector. The effect is just about the same as if there were 30 full moons shining in the ceiling. The light is not sharp and intense, but abundant and mellow, and not painful to the eyes.

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150 "	30 x 66	15 "	19 x 26
100 "	27 x 55	10 "	15 x 21

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RAILWAYS AND MINES.

Capitalists who seek safe and profitable investments, free from risk, should act only upon the soundest information. The market prices for the most part governed by the immediate supply and demand, and the operations of speculators, without reference to the bona fide merits of the property. Railways depend upon the traffic, expenditure, and capital accounts, the probabilities of alliance or competition with neighbouring companies, the creation of new shares, the state of the money market as affecting the renewal of debentures, and other considerations founded on data to which those only can have access who give special attention to the subject. Mines afford a wider range for profit than any other public securities. The best are free from debt, have large reserves, and pay dividends bi-monthly varying from £15 to £25 per cent. per annum. Instances frequently occur of young mines rising in value 400 or 500 per cent. But this class of security, more than any other, should be purchased only upon the most reliable information. The undersigned devote special attention to railways and mines, afford every information to capitalists, and effect purchases and sales upon the best possible terms. Thirty years' experience in mining pursuits justifies us in offering our advice to the uninitiated in selecting mines for investment; we will, therefore, forward, upon receipt of Post-office order for 5s., the names of six dividend and six progressive companies that will, in our opinion, well repay capitalists for money employed.

Messrs. TREIDENICK AND CO., STOCK AND SHAREBROKERS, and DEALERS IN BRITISH MINING SHARES, 78, LOMBARD STREET, E.C.

STATISTICS OF AND OBSERVATIONS UPON THE MINES OF CORNWALL AND DEVON.

Illustrated by Maps, Plans, and Sections of the Principal Mining Districts in the two counties. By Mr. THOMAS SPARGO,

Mining Engineer, Stock and Sharebroker, Gresham-house, Old Broad-street, London.

It contains detailed particulars of the indications and prospects of all the important mines in the two counties, with annual statistical returns, and dividends paid by each; sections and diagrams of the most productive districts, with explanatory notes upon each; as also a map of Cornwall, showing its area and population.

OPINIONS OF THE PRESS.

The mine proprietors of the Western counties have good reason to congratulate themselves that so able an advocate of British Mining as Mr. Thomas Spargo has devoted his energies to the extension of mining literature; while capitalists embarking in mine adventure will thank him for placing requisite and very desirable knowledge so immediately within their reach. Under the title of "The Statistics of and Observations upon the Mines of Cornwall and Devon," Mr. Spargo has issued a manual of statistics and instructive details which cannot fail to be useful to those seeking information. That his explanations may be more readily comprehended, he has illustrated his work with a series of very neatly executed maps of the several mining districts to which he refers.—*Mining Journal.*

The work altogether forms an acceptable addition to the existing stock of mining literature, and may be commended to the attention of those who wish to extend their acquaintance with this branch of our home industry.—*Daily News.*

Mr. Spargo's "Statistics of and Observations upon the Mines of Cornwall and Devon" deserves to be perused by all parties who are interested in these investments, and the facts and opinions presented appear to be stated in a fair and candid manner.—*Herald.*

Mr. Spargo's Statistics is full of information useful to parties associated either practically or commercially with mining undertakings.—*Star.*

An instructive publication, deserving of every encouragement.—*Daily Telegraph.*

We recommend this work as a guide to the mines of Cornwall and Devon.—*Chronicle.*

The pamphlet is worthy the attention of all engaged in mining speculations.—*Post.*

It contains in a compressed, but still comprehensive form, all the information requisite to guide an adventurer in the selection of mines for legitimate investment.—*Westminster.*

From these the mining speculator may arrive at a correct judgment on all mining undertakings.—*Shropshire Conservative.*

No adventurer should enter upon any mining undertaking until he has carefully studied this pamphlet. He will find it a true guide when seeking for a profitable investment.—*Durham County Advertiser.*

A work of rare merit, filled with original matter, concise but comprehensive, and will be found of inestimable value to parties desirous of investing capital in mining undertakings.—*Doncaster Chronicle.*

A guide to safe investments, and should be consulted by an intended investor before purchasing shares in any mining undertaking.—*Cheltenham Chronicle.*

It contains accurate information upon all points demanding consideration, and as the work of a practical miner may be confidently relied upon.—*Devonport and Plymouth Telegraph.*

This work will prove of great utility to all who are concerned in mining operations.—*This Little work is of inestimable value to all persons interested in the mining operations of the country.*—*Blackburn Times.*

We earnestly recommend the consideration of Mr. Spargo's book to all mining speculators.—*Hereford Journal.*

This work should be read by every man interested in mining adventures.—*Edinburgh An excellent practical treatise upon an important staple of our commerce, the mines of Cornwall.*—*Leicester Herald.*

We recommend this pamphlet to the attentive consideration of our readers.—*Halfway*

This work ought to have attentive consideration, and when acted upon will prove a safe guide to all investors in mining undertakings.—*Oldham Chronicle.*

Mr. Spargo's practical work affords the means of obtaining such a knowledge as cannot fail to guide the reader to safe investments.—*Lincolnshire Herald.*

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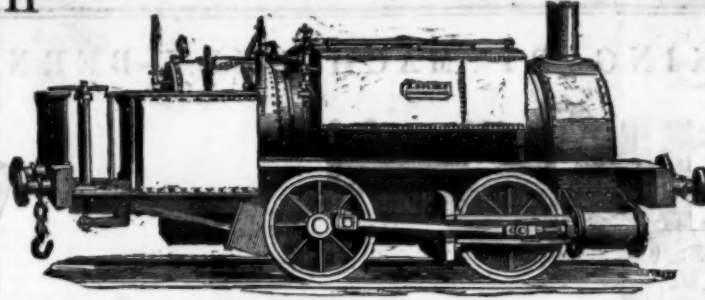
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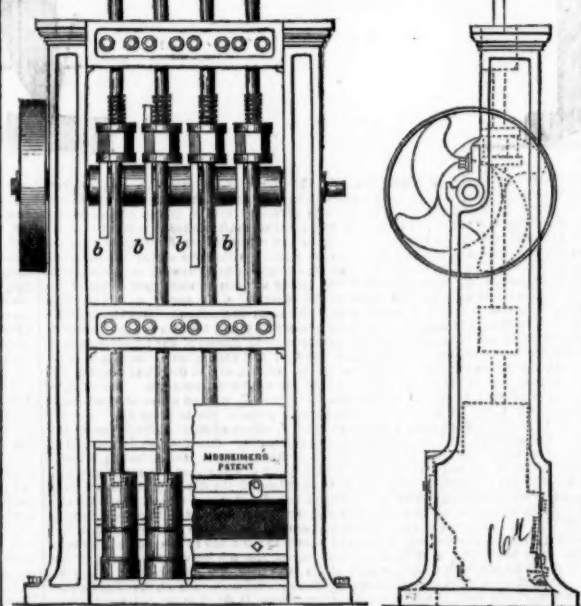
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